VALLEY VIEW WATER ASSOCIATION (PWS 6150022)
SOURCE WATER ASSESSMENT FINAL REPORT

March 14, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment areas and sensitivity factors associated with the wells and the aquifer characteristics.

This report, *Source Water Assessment for Valley View Water Association, Soda Springs, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Valley View Water Association PWS (# 6150022) is a community drinking water system located in Caribou County. The system consists of two wells located in a fenced and locked well lot approximately four miles west of Soda Springs and approximately one mile north of Highway 30. Well #1 is located within a six-foot deep pit enclosed with a hatch door. Well #2 is approximately 10 feet from Well #1. The wells are manifolded and water is delivered to a 20,000-gallon, underground, concrete storage tank that supplies drinking water to 14 homes through gravity feed. Five other homes that are located above the storage tank utilize suction pumps to obtain drinking water from the system through one connection. The water system chlorinates by adding one gallon of chlorox per month, and two gallons if bacteria concerns arise. The water system serves approximately 35 persons through 15 connections.

The potential contaminant sources within the delineation capture zone of the wells are a road and a lake. If an accidental spill occurred into the road corridor, inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminants, or microbial contaminants could be added to the aquifer systems. An accidental spill or release in the lake could potentially add IOCs, VOCs, or SOCs to the aquifer systems. No other potential contaminant sources were identified within the delineated area that may contribute to the overall vulnerability of the water sources.

Final well susceptibility scores are derived from heavily weighting potential contaminant inventory/land use scores and adding them with hydrologic sensitivity and system construction scores. Therefore, a low rating in one category coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. Potential contaminants are divided into four categories: IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), SOCs (e.g., pesticides), and microbial contaminants (e.g., bacteria). As a well can be subject to various contamination settings, separate scores are given for each type of contaminant.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). The last detection of total coliform bacteria in the distribution system was recorded in January 2003. However, no bacteria have been detected at the wells. No SOCs or VOCs have been detected in the well water. The IOCs fluoride, nitrate, and sodium have been detected in the well water but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA. Traces of alpha and beta particles (radionuclides) have been detected in distribution system.

In terms of total susceptibility, the wells rated high for IOCs, VOCs, and SOCs. Well #1 rated high and Well #2 rated moderate for microbial contaminants. Hydrologic sensitivity and system construction scores for both wells rated high and potential contaminant land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbial contaminants. Limited well log information and the irrigated agricultural land use contributed to the overall susceptibility ratings of the system.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Valley View Water Association, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). The system should upgrade their wells to properly protect them from surface flooding (e.g., casings must be at least 18 inches above the ground surface, wells must be vented properly, well lots must be at least 50 feet from any potential contaminant source). During DEQ's visit in October 2002, the gate for the fenced area around the wells was unlocked and open. This gate should be kept closed and locked as a security measure to restrict access to the wells. Also, weeds located within the 50-foot sanitary setback should be removed. Although the land within the wells' sanitary setback is partially owned by the water system, purchasing the entire sanitary setback will give the water system better control over activities within this area. In the meantime, working with landowners and monitoring activities in the vicinity of the wells are good protection measures. The water system should consider using a National Science Foundation (NSF) approved chlorine. If the water system chlorinates the water on a regular basis, chlorine residual should be tested to ensure that the bacteria problem is being addressed. To learn the most appropriate chlorinating measures for your water system, contact Mr. Craig Madsen, the Drinking Water Coordinator for the Southeastern District Health Department. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the Valley View Water Association, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating homeowners and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Caribou County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR
VALLEY VIEW WATER ASSOCIATION, SODA SPRINGS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

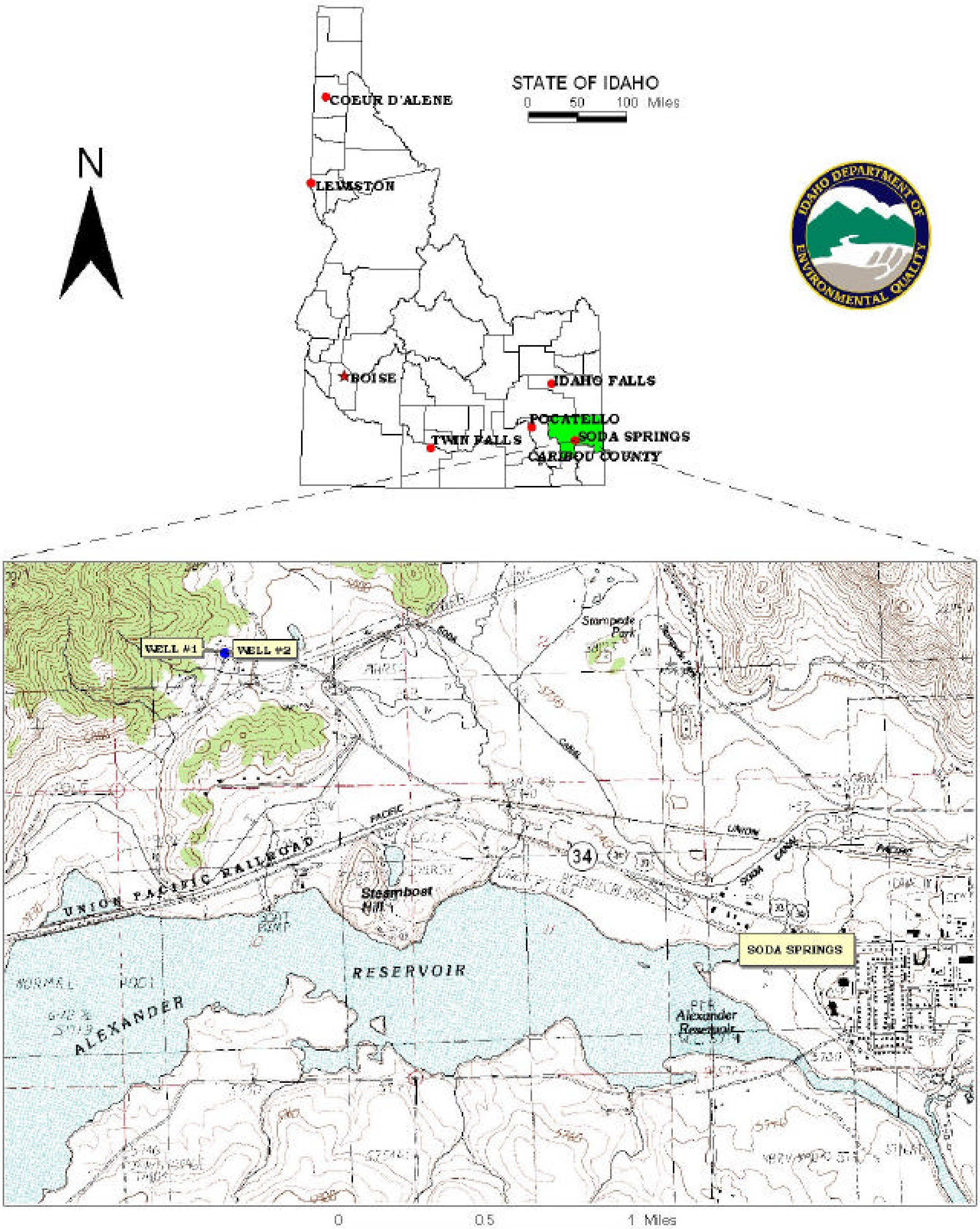
The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Valley View Water Association PWS (# 6150022) is a community drinking water system located in Caribou County (see Figure 1). The system consists of two wells located in a fenced and locked well lot approximately four miles west of Soda Springs and approximately one mile north of Highway 30. Well #1 is located within a six-foot deep pit enclosed with a hatch door. Well #2 is approximately 10 feet from Well #1. The wells are manifolded and water is delivered to a 20,000-gallon, underground, concrete storage tank that supplies drinking water to 14 homes through gravity feed. Five other homes that are located above the storage tank utilize suction pumps to obtain drinking water from the system through one connection.

FIGURE 1. Geographic Location of Valley View Water Association



The water system chlorinates by adding one gallon of chlorox per month and two gallons if bacteria concerns arise. The water system serves approximately 35 persons through 15 connections.

The last detection of total coliform bacteria in the distribution system was recorded in January 2003. No coliform bacteria have been detected at the wells. No synthetic organic chemicals (SOCs) or volatile organic chemicals (VOCs) have been detected in the well water. The inorganic chemicals (IOCs) fluoride, nitrate, and sodium have been detected in the well water but at concentrations below the maximum contaminant level (MCL) for each chemical, as established by the EPA. Traces of alpha and beta particles (radionuclides) have been detected in distribution system.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the PWS's zones of contribution. WGI used a calculated fixed radius model approved by the Source Water Assessment Plan (DEQ, 1999) in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT zones for water associated with the “Soda Springs” hydrologic province in the vicinity of the Valley View Water Association. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

Hydrogeologic Conceptual Model

The Bear River Basin includes four hydrologic provinces within Idaho: Bear River – Dingle Swamp, Soda Springs, Gem Valley – Gentile Valley, and Cache Valley. The Bear River originates in the Uinta Mountains of northern Utah and winds its way through over 500 miles of Wyoming, Idaho, and Utah to terminate in a freshwater bay of the Great Salt Lake just 90 miles west of its source (Dion, 1969, p. 6). The Bear River enters Idaho near Border, Wyoming and flows along the north edge of the Bear River Plateau. Flowing north through the Bear River – Dingle Swamp hydrologic province, it passes into the Soda Springs hydrologic province east of the Bear River Range.

Upon entering the Gem Valley – Gentile Valley hydrologic province, it swings south. Now west of the Bear River Range, the river passes through the Oneida Narrows into the Cache Valley hydrologic province. Over most of its course through Idaho, the Bear River is gaining and in direct hydraulic communication with the major aquifer systems of the four hydrologic provinces. The exception is a small reach between the cities of Alexander and Grace where it is generally losing and is perched over the regional fractured basalt aquifer (Dion, 1969, p. 30).

Ground water in the Bear River Basin is found in Holocene alluvium, Pleistocene basalt, and rocks of the "Pliocene (?)" [sic] Salt Lake Formation, pre-Tertiary undifferentiated bedrock, and possibly the "Eocene (?)" [sic] Wasatch Formation (Dion, 1969, pp. 15 and 16). Rocks of the Salt Lake Formation, which include freshwater limestone, tuffaceous sandstone, rhyolite tuff and poorly-consolidated conglomerate, outcrop along the major valley margins and may underlie the valley-fill alluvium (Dion, 1969, pp. 16 and 17). Many of the wells drilled into this formation do not yield water. The few wells that do produce water yield as much as 1,800 gallons per minute (gpm) from beds of sandstone and conglomerate.

The Wasatch Formation is restricted to the Bear Lake Plateau and small areas northwest of Bear Lake (Dion, 1969, p. 17). The formation is composed largely of tightly cemented conglomerate and sandstone with smaller amounts of shale, limestone, and tuff. The primary pore space is typically impermeable. Water movement may occur through joints and fractures or more permeable zones that are thought to exist along the relatively flat-lying formation (Dion, 1969, p. 17). Springs occur at the margins of the formation.

Precipitation in the basin ranges from 10 inches per year (in./yr.) on the floor of Bear Lake Valley to over 45 in./yr. on the Bear River Range (Dion, 1969, pp. Vll and 11). Applied over the entire basin, precipitation amounts to approximately 2.3 million acre-feet annually. Precipitation is also the principal source of recharge to the basin's aquifers in conjunction with spring snowmelt and runoff, irrigation seepage, and canal losses.

Natural ground water discharge is by flow to the Bear River, springs, seeps along river banks, and evapotranspiration in large marshy areas (Dion, 1969, p. VIII). Some discharge may also occur by way of underflow to the Portneuf River drainage through basalt flows at Tenmile pass and near Soda Point.

Ground water is obtained from both springs and wells in the Bear River Basin. Hundreds of springs issue primarily from fractures and solution openings in the bedrock on the margins of the basin (Dion, 1969, p. 47). Water production from wells in the four hydrologic provinces is primarily from alluvial and basalt aquifers; however, some wells tap conglomerate, sandstone, limestone and shale aquifers of the Salt Lake and possibly the Wasatch formations (Dion, 1969, p. VII).

Soda Springs

The Soda Springs hydrologic province occupies approximately 220 square miles north of the Bear River – Dingle Swamp hydrologic province. The Basin and Range physiographic province is generally north to south trending. The mean annual precipitation is 15 to 16 inches, with the majority falling as snow during the winter months (IWRB, 1981, p. 16). Mountains composed of pre-Tertiary formations of carbonate, quartzite, shale, and sandstone bound the province to the northeast and southwest (Dion, 1969, p. 18, and IWRB, 1981, pp. 15-16). The major geologic feature is the Blackfoot Lava Field, which is marked with large northwest trending scarps (Dion, 1974, p.9). The province is marked with extensive faulting surrounding the city of Soda Springs (Dion, 1974, Figure 4).

The valley is filled with Quaternary sediments and tufa and Quaternary and Tertiary basalts (Dion, 1974, Figure 4). Valley-fill sediments are generally thin and produce limited quantities of water. The tufa produces upward of 25 cubic feet per second (ft^3/sec) of water in the form of mineral springs. Basalt flows extending from the Blackfoot Reservoir to south of Soda Springs are the principal aquifer yielding 500 to 3,500 gpm to wells (Dion 1974, p. 9 and Table 1). The total thickness of the basalt ranges from a thin sheet near the flows margin to several hundred feet near the center. The Salt Lake Formation sandstones, limestones, shales and pre-Tertiary undifferentiated bedrock underlie the valley fill and form the surrounding mountains (Dion, 1969, p. 16).

The primary source of ground water recharge is leakage from Blackfoot Reservoir, precipitation, and irrigation. A 3-mile reach of the Blackfoot River directly above the reservoir is also thought to contribute recharge (Dion 1974, p. 12).

Ground water is discharged from the basalt aquifer through springs, evapotranspiration, and underflow to the Bear River and the eastern end of Soda Point Reservoir. Ground water is also discharged by irrigation and domestic wells (Dion, 1974, p. 14).

The ground water flow direction south of Blackfoot Reservoir is southwest past the city of Soda Springs and then toward the Bear River and Soda Point Reservoir (Dion, 1969, p. 19).

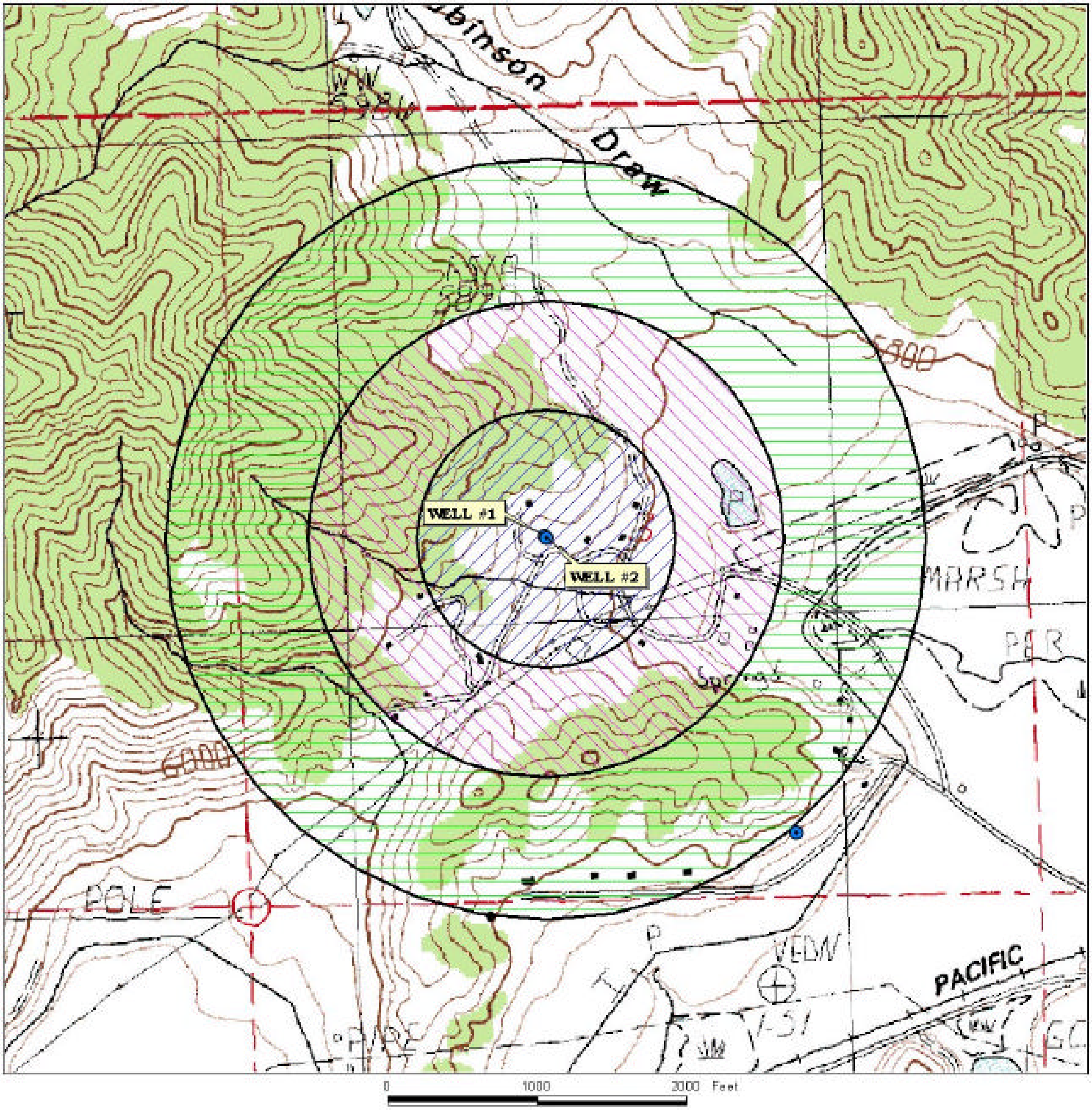
Modeling Approach

The calculated fixed-radius method was used to delineate capture zones for PWS wells completed in sedimentary rock aquifers within the Soda Springs hydrologic province. The fixed radii for the 3-, 6-, and 10-year capture zones were calculated using equations presented by Keely and Tsang (1983) for the velocity distribution surrounding a pumping well. Total area for the capture zone of the Valley View Water Association is 464 acres.

These PWS wells are completed in various geologic media including sandstone and limestone. Hydraulic conductivities of 15 (Rasmussen, 1964; Morris and Johnson, 1967), and 42 feet per day (ft/day) (Segol and Pinder, 1976, pp. 65-70.) were used for wells completed or assumed completed in sandstone and limestone, respectively. The effective porosity (0.2) and uniform hydraulic gradient (0.003) are the default values presented in Table F-3 of the Idaho Wellhead Protection Plan for mixed volcanic and sedimentary rocks, primarily sedimentary rocks (IDEQ, 1997, p. F-6). The aquifer thickness is the open interval for the two limestone wells that have known completion. An aquifer thickness of 100 feet was assumed for the Valley View Water Association wells that have unknown completion dates.

Because the wells are manifolded and in the same area, they share the same delineation. The delineated source water assessment area for the Valley View Water Association wells can be described as three concentric circles: 860 feet radius (3-year TOT), 1,587 feet radius (6-year TOT) and 2,536 feet radius (10 year TOT) (see Figure 2). The actual data used by WGI in determining the source water assessment delineation area is available from DEQ upon request.

FIGURE 2. Valley View Water Association Delineation Map and Potential Contaminant Source Locations



PWS# 6150022
WELL #1 & #2

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified a road and a lake as potential contaminant sources within the delineated area.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in September and October 2002. The first phase involved identifying and documenting potential contaminant sources within the Valley View Water Association source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. The enhanced inventory was completed with the assistance of Steve Daley. At the time of the enhanced inventory, no additional potential contaminant sources were found within the delineated source water area. An inventory of potential contaminant sources is included in Table 1 below. A map with the well locations, delineated area, and potential contaminant sources are provided with this report (see Figure 2).

Table 1. Valley View Water Association, Well #1 and Well #2, Potential Contaminant Inventory

Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
Road	0–3	GIS Map	IOC, VOC, SOC, Microbials
Road	3-6, 6-10	GIS Map	IOC, VOC, SOC
Lake	3-6	GIS Map	IOC, VOC, SOC

[1] **TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**

[2] **IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic sensitivity, system construction, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the wells is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay have better filtration capabilities and therefore are typically more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity was rated high for both wells (see Table 2). This is based upon moderate- to well-drained soil classes as defined by the National Resource Conservation Service (NRCS). The well log for Well #1 was unavailable, making it difficult to determine the composition of the vadose zone, the depth to first ground water, and the presence of any fine-grained sediment layers that would reduce the movement of contaminants to the aquifer. When no information is available, a higher, more conservative, score is given. The subsurface material for Well #2 consists of clay, clay and boulders, red rock, and white quartz rock with sand. The vadose zone composition for Well #2 is predominantly clay, and clay with boulders. Although low permeable clay layers are present (approximately 23 feet), they do not constitute an aquitard of 50 feet or more above the water-producing zone. In addition, the depth to first ground water (approximately 83 feet below ground surface (bgs)) is less than the recommended 300 feet bgs.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The well log for Well #1 was unavailable, limiting the amount of construction information for this well. However, the 2000 sanitary survey (conducted by Southeastern District Health Department) provides that Well #1 was drilled to a depth of 190 feet and has a 12-inch diameter casing. It is located in a six-foot deep pit about 10 feet from the fence that surrounds the perimeter of the well lot for both wells. The water system believes the well was drilled in the 1950's or 1960's.

Well #2 is approximately 10 feet from Well #1. It is the newer well and was drilled in 1979 to a depth of 205 feet. It has an 8-inch diameter casing from +18 inches to 160 feet bgs and extends to white quartz. The casing thickness is 0.250 inch and the well is non-perforated. It is recommended that an 8-inch diameter casing has a casing thickness of 0.280-inch. The well has a surface seal to a depth of 18 feet and was sealed using well cuttings. The static water level at time of drilling was 93 feet bgs. The wells are manifolded outside of the pit before entering the 20,000-gallon, buried, concrete storage tank.

The system construction score was rated highly susceptible for both wells (see Table 2). The 2000 sanitary survey indicates that the wells are located outside of a 100-year floodplain. However, Well #1 is not properly protected from surface flooding. The casing of Well #1 is recessed two feet below ground surface. According to DEQ standards, the casing must extend at least 18 inches above ground surface and 12 inches above the well house floor. The wellhead and surface seals are maintained and the well casings have been vented, but they both lack the approved screened vents for a PWS. Provisions are that the vent should terminate in a downturned position, at or above the top of the casing in a minimum 1 ½ inch diameter opening covered with a 24 mesh, corrosion resistant screen (Recommended Standards for Water Works, 3.2.7.5). The purpose of the vent is to vent the space between the casing and the column and prevent a vacuum from forming when the well turns on and draws down the water table. A vacuum could draw in contamination through joints or leaks in the casing or cause the well to slough. The scores were increased due to a lack of well construction information and the lack of proper protection from surface flooding for Well #1, and the absence of approved screened vents for both wells.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gpm a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case, there was insufficient information available to determine if Well #1 met all the criteria outlined in the IDWR Well Construction Standards and was rated conservatively. According to the well driller's log for Well #2, the pump test conducted was less than the 6-hour pump test required. In addition, the bore hole and casing are both 8-inches in diameter indicating that no annular seal is present. The casing thickness is less than the thickness recommended for a PWS drinking water source. Comparing available well construction information to the IDWR criteria mentioned above, Well #2 was given an additional point for not meeting all the current system construction standards.

Potential Contaminant Source and Land Use

The wells rated moderate for IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), and SOCs (e.g., pesticides), and low for microbial contaminants (e.g., bacteria). Agricultural land use increased in the 3 to 6 and 6 to 10 year TOT zones, contributing to the land use score. The delineation crosses a nitrate priority area and the total herbicide use of the county was rated as high, also contributing to the potential contaminant and land use scores for the Valley View Water Association wells.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the wellhead will automatically give a high susceptibility rating to the well, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0- to 3-year TOT zone (Zone 1B) contribute greatly to the overall ranking.

Table 2. Summary of Valley View Water Association Susceptibility Evaluation

Drinking Water Sources	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	H	H	H	H	H
Well #2	H	M	M	M	L	H	H	H	H	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the wells rated high for IOCs, VOCs, and SOCs. Well #1 rated high and Well #2 rated moderate for microbial contaminants. Hydrologic sensitivity and system construction scores for both wells rated high and potential contaminant land use scores were moderate for IOCs, VOCs, and SOCs, and low for microbials. Limited well log information and the irrigated agricultural land use contributed to the overall susceptibility ratings of the system.

The last detection of total coliform bacteria in the distribution system was recorded in January 2003. No coliform bacteria have been detected at the wells. No SOCs or VOCs have been detected in the well water. The IOCs fluoride, nitrate, and sodium have been detected in the well water but at concentrations below the MCL for each chemical, as established by the EPA. Traces of alpha and beta particles (radionuclides) have been detected in distribution system.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Valley View Water Association, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. The system should upgrade their wells to properly protect them from surface flooding (e.g., casings must be at least 18 inches above the ground surface, wells must be vented properly, well lots must be at least 50 feet from any potential contaminant source). During DEQ's visit in October 2002, the gate for the fenced area around the wells was unlocked and open. This gate should be kept closed and locked as a security measure to restrict access to the wells. Also, weeds located within the 50-foot sanitary setback should be removed. Although the land within the wells' sanitary setback is partially owned by the water system, purchasing the entire sanitary setback will give the water system better control over activities within this area. In the meantime, working with landowners and monitoring activities in the vicinity of the wells are good protection measures. The water system should consider using an National Science Foundation (NSF) approved chlorine. If the water system chlorinates the water on a regular basis, chlorine residual should be tested to ensure that the bacteria problem is being addressed. To learn the most appropriate chlorinating measures for your water system, contact Mr. Craig Madsen, the Drinking Water Coordinator for the Southeastern District Health Department. As land uses within most of the source water assessment areas are outside the direct jurisdiction of the Valley View Water Association, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success. Educating homeowners and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods and the importance of water conservation. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Caribou County Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office	(208) 236-6160
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

References Cited

Communication. February 2003. Discussions with Mr. Steve Daley, Operator for Valley View Water Association, regarding water system and well construction.

Dion, N.P., 1969, Hydrologic Reconnaissance of the Bear River in Southeastern Idaho, U.S. Geological Survey and Idaho Department of Reclamation, Water Information Bulletin No. 13, 66 p.

Dion, N.P., 1974, An Estimate of Leakage from Blackfoot Reservoir to Bear River Basin, Southeastern Idaho, U.S. Geological Survey and Idaho Department of Water Administration, Water Information Bulletin No. 34, 24 p.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Keely, J.F. and C.F. Tsang, 1983, Velocity Plots and Capture Zones of Pumping Centers for Ground- Water Investigations, Ground Water, vol. 21, no. 6, pp. 701-714.

IDAPA 58.01.08, Idaho Rules for Public Drinking Water Systems, Section 004.

Idaho Division of Environmental Quality, 1997, Idaho Wellhead Protection Plan, Idaho Wellhead Protection Work Group, February.

Idaho Department of Water Resources. 1979. Well Driller's Logs provided by Valley View Water Association.

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

Idaho Water Resources Board, 1981, Soda Springs Dam Feasibility Study, 146 p.

Morris, D.A., and A.I. Johnson, 1967, Summary of hydrological and physical properties of rock and soil materials as analyzed by the hydrologic laboratory of the U.S.Geological Survey. USGS Water Supply Paper 1839-D.

Rasmussen, W.C., 1964, Permeability and Storage of Heterogeneous Aquifers in the U.S. International Association of Scientific Hydrologic Publication 64, 317-325.

Segol, G., and G.F. Pinder, 1976, Transient Simulation of Saltwater Intrusion in Southeastern Florida, Water Resources Res. 12(1), 65-70.

Safe Drinking Water Information System (SDWIS). Idaho Department of Environmental Quality.

Southeastern District Health Department. 2000. Sanitary Survey for Valley View Water Association: PWS #6150022.

Washington Group International, Inc, April 2002. Source Area Delineation Report for the "Soda Springs" Hydrologic Province and Southeast Idaho Springs.

Attachment A

Valley View Water Association

Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Formula for Well Sources
The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : VALLEY VIEW WATER ASSN   Source Name: WELL 1
Public Water System Number: 6150022   3/6/03 4:39 PM

1. System Construction

		SCORE
Drill Date	50's or 60's	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain and protected from surface flooding	NO	1
Total System Construction Score		6

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	Irrigated Pasture	1	1	1	1
Farm chemical use high	YES	0	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC	VOC	SOC	Microbial
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	3	3	2

Potential Contaminant / Land Use - ZONE II

		IOC	VOC	SOC	Microbial
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0

Potential Contaminant / Land Use - ZONE III

		IOC	VOC	SOC	Microbial
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		13	11	12	3

	IOC	VOC	SOC	Microbial
4. Final Susceptibility Source Score	15	14	14	13
5. Final Well Ranking	High	High	High	High

Ground Water Susceptibility Report   Public Water System Name : VALLEY VIEW WATER ASSN   Source Name: WELL 2
Public Water System Number: 6150022   03/06/03 4:39 PM

1. System Construction

		SCORE
Drill Date	1979	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain and protected from surface flooding	YES	0
Total System Construction Score		5

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	Irrigated Pasture	1	1	1	1
Farm chemical use high	YES	0	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC	VOC	SOC	Microbial
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		5	3	3	2

Potential Contaminant / Land Use - ZONE II

		IOC	VOC	SOC	Microbial
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0

Potential Contaminant / Land Use - ZONE III

		IOC	VOC	SOC	Microbial
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

	IOC	VOC	SOC	Microbial
Cumulative Potential Contaminant / Land Use Score	13	11	13	3
4. Final Susceptibility Source Score	14	13	14	12
5. Final Well Ranking	High	High	High	Moderate